b. The threads from the spores produce a limited growth which develops into a promycelium ; this instead of "sporidia" proper produces slender branches, which, growing toward each other, copulate by their ends. From this point of union another growth begins.

2 THECAPHORA, Fingerh.

T. hyalina, Fingerh.

II. The promycelium by transverse septa divides itself into several cells from each of which one or more "sporidia" are produced.

3. USTILAGO, Link. (Persoon, Tulasne.)

4. SCHIZONELLA, Schroeter (in Cohn's Beitr. z. Biol. d. Pfl. II Bd. p. 362.)

5. TOLYSPORIUM, mihi.

T. Junci. (Syn. Sorosporium Junci, Schr.)

III. The promycelium produces on its end a whorl of 2 to 8, usually spindle-shaped branches ("sporidia") which by pairs usually copulate sidewise. With or sometimes without this copulation these "sporidia" produce either secondary "sporidia," or long, simple or branched thin mycelial threads.

6. TILLETIA, Tulasne.

7. ENTYLOMA, de Bary. To which genus as before understood the two species *E. Aschersonii* and *E. Magnusii* are added

8. MELANOTÆNIUM, de Bary.

M. endogenum, de Bary. This may yet be united with *Entyloma*.

9. SCHROETERIA, Winter.

Schr. Delastrina, Winter. (Syn. Geminella Delastrina, Schroeter.)

10. UROCYSTIS, Rabenhorst. Of this genus the mode of growth of but four species has been observed, i. e. *U. occulta*, Rab., *U. pompholygodes*, Rab., *U. Violæ*, F. v. Wald., and *U. primulicola*, P. Magnus. *U. Corydalis*, Niessl., (in Thuemen Mycoth. 1626) is more nearly related to *Entyloma* as here understood, but is very different from *Entyloma Corydalis*, de Bary.

11. TUBURCINIA, Fries.

T. Trientalis, Berkeley and Broome.

IV. Mode of growth unknown. Here however are placed all the species of *Sorosporium*, Rudolph, and *Thecaphora*, Fingerh., whose mode of growth has not been certainly shown; and also the genus

12. VOSSIA, Thuemen.

V. Molinæ, Thuem. (Winter had placed this under *Tilletia*.)

J. T. ROTHROCK.

Respiration of Plants.—We were once taught that one of the essential differences between animals and plants is that the former exhale carbonic acid and inhale oxygen, while in the latter the process is reversed So long as chlorophyll-bearing plants alone were studied this view was to a certain extent excusable, for the more abundant effects of assimilation obscured the comparatively small effects of respiration. But modern investigation has come to a knowledge of the fact that the activities of every living cell, whether plant or animal, are similar, and that oxygen starvation is just as certain destruction for a plant cell as for an animal cell. The food used and the excretory products are in both cases the same. In regard to chlorophyll-bearing plants then the additional statement can be made that some plants differ from most animals and all other plants in being able to make their own food.

Now this using of food, called respiration, and common to all life, demands the presence of oxygen, and the question has arisen with regard to plants whether this oxygen is derived directly from the free oxygen of the air or is a secondary product resulting from intramolecular decompositions. It has been observed that germinating plants will continue to evolve carbonic acid in an atmosphere of nitrogen or hydrogen, or in a vacuum. Wortmann, observing that the amount of carbonic acid evolved from germinating plants was the same when placed in air or in a vacuum, proposed the theory "that all the carbonic acid produced in plant respiration has its origin in intramolecular decompositions; or, in other words, that the free oxygen of the air takes no direct part in the formation of the carbonic acid in respiration." Dr. W. P. Wilson, an American student at Tubingen, Wurtemberg, has been experimenting upon this subject, and in the *Am. Jour. of Science* for June he gives a condensed abstract of some of his results, which will later be published in full. His experiments show that Wortmann's theory falls to the ground because it is founded upon a fallacy. That there is an intramolecular respiration as differing from a normal is easily proved, but that the amount of carbonic acid given off by the former equals that given off by the latter is untrue, for Dr. Wilson's experiments showed, in every case but one, a rapid diminution in the evolution of carbonic acid when he substituted an atmosphere of hydrogen for air. Hence the conclusion is irresistible that the carbonic acid excreted in plant-respiration is a partial product of direct oxidation from the free oxygen of the air. W. Pfeffer shows that even if Wortmann's experiments had been verified his theory would still fail, because "if an equal amount of carbonic acid were formed in both intramolecular and normal respiration this would only prove that the same number of carbon affinities for oxygen had been satisfied in each case, but would in no way indicate from whence the supply of oxygen came. And in case free oxygen was active in normal respiration, still in intramolecular, when free oxygen was absent, the full supply might yet be obtained through constant powerful attractive forces which could take oxygen from other combinations and in this way give rise to secondary changes." Dr. Wilson's experiments also verify what has previously been taught with regard to respiration, viz., that the presence of light does not in any appreciable degree directly affect the amount of carbonic acid given off, a capital point to use in contrasting respiration and assimilation.—J. M. C.

Notes from Northern Iowa.—*Psoralea esculenta*, Pursh, grows on dry knolls, but rarely matures fruit. This plant, the *Pomme de Prairie* of the voyageurs, has large, starchy roots which are quite palatable to a botanist made hungry by a long tramp. *P. argophylla*, Pursh, is much more common than the former, preferring lower grounds. I have not, after three seasons search, been able to find a single mature seed. It must, however, fruit in favorable years.